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**FINAL REPORT K-65 DECANT SUMP TANK
REMOVAL ACTION AUGUST 1992**

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DOE/EPA

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ENCLOSURE

FINAL REPORT

K-65

DECANT SUMP TANK REMOVAL ACTION

August 1992

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FERNALD ENVIRONMENTAL MANAGEMENT PROJECT

FINAL REPORT

K-65 DECANT SUMP TANK REMOVAL ACTION

AUGUST 1992

Submitted by:

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August 1992

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ACRONYMS

AEA	Atomic Energy Act
ARARS	Applicable, Relevant and Appropriate Requirements
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CFR	Code of Federal Regulations
ETS	Effluent Treatment System
FEMP	Fernald Environmental Management Project
FFCA	Federal Facilities Compliance Agreement
FMPC	Feed Materials Production Center
FR	Federal Register
DOE	Department of Energy
DOE-FN	Department of Energy Fernald Office
NCP	National Oil and Hazardous Substances Contingency Plan
NPDES	National Pollutant Discharge Elimination System
OEPA	Ohio Environmental Protection Agency
OSHA	Occupational Safety and Health Administration
OU	Operable Unit
PACD	Proposed Amended Consent Decree
RAWP	Removal Action Work Plan
RCRA	Resource Conservation and Recovery Act
RI/FS	Remedial Investigation/Feasibility Study
RSE	Removal Site Evaluation
RWP	Radiation Work Permit
WEMCO	Westinghouse Environmental Management Company of Ohio
USC	United States Code
U.S. EPA	United States Environmental Protection Agency

EXECUTIVE SUMMARY

One of the Remedial Investigation/Feasibility Study (RI/FS) identified operable units, Operable Unit 4 (OU 4), at the Fernald Environmental Management Project (FEMP) includes the two K-65 silos (Silos 1 and 2), the metal oxide silo (Silo 3), Silo 4, the K-65 decant sump tank system, and the potentially contaminated soils surrounding the waste storage silos. A Removal Site Evaluation (RSE) was generated by the Department of Energy (DOE) consistent with 40 CFR 300.410. It was determined by the DOE-Fernald Office (DOE-FN), as the lead agency at the FEMP, that a removal action was necessary to remove liquid from the K-65 Decant Sump Tank. This removal action was conducted pursuant to the Consent Agreement under Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) 120 and 106(a) between the DOE and the United States Environmental Protection Agency (U.S. EPA).

The K-65 Decant Sump Tank Removal Action was implemented to protect human health and the environment from a potential release of the liquid within the decant sump to the surrounding subsoils. Pumping was initiated on March 26, 1991, and was completed on April 16, 1991, 10 days ahead of schedule. During this period approximately 10,000 gallons of sump liquid were removed from the decant sump tank and access piping. Prior to treatment at the FEMP wastewater treatment facilities, samples of the liquid were taken and analyzed in accordance to FEMP hazardous waste management and control practices. On evaluation of the analytical results, it was determined that the liquid could be treated using approved treatment procedures for heavy metals and radionuclides at the existing FEMP wastewater treatment facilities. Treatment was completed on May 12, 1992. After treatment the wastewater was discharged through a National Pollutant Discharge Elimination System (NPDES) monitoring point.

Rainwater infiltration into the decant sump system is expected to occur slowly over time. Therefore, post-removal action monitoring of the liquid level is required, as a best management practice action, until final remediation is initiated. Future removal of the liquid in the K-65 decant sump tank may be required based on the monitoring results.

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OVERVIEW

The K-65 Silos are large concrete structures built in 1951 and 1952, which contain the residues from pitchblende ore processing operations at the Fernald Environmental Management Project, formally known as the Feed Materials Production Center (FMPC), and at St. Louis (Mallinckrodt Chemical Works). These residues contain radium, uranium, and thorium (Th-230). Beneath each silo, an underdrain system, which was designed to discharge into a sump tank, was constructed to collect drainage from the surrounding subsoils and any potential leakage through the concrete and clay base on which Silos 1 and 2 were constructed.

The silos were designed with a decant system which also discharged into the sump tank. The silos were filled by a process that consisted of pumping a slurry, settling of the solids, and decanting of the liquid, which was recycled. The decant system was designed to remove the liquid portion of the K-65 slurry after the solids had settled. Since this liquid was withdrawn in conjunction with the process of filling the silos, it was used on a daily basis during the years the silos were filled. As the primary purpose of the sump tank was to receive the liquid, it was called the decant sump tank. The decant tank has a 9,000-gallon design capacity.

Earthen berms were placed around the silos in 1964 to provide structural support to the silos. Berm construction was done in two phases. Due to the steep slope of the first berm, slumping occurred. A second berm was placed over the first to stabilize the berm slope. At this time, the decant system was disconnected from the decant sump tank since the silos were no longer being filled, but the underdrain system remained intact. The purpose was to continue to have the capability of collecting any drainage to the underdrain system.

Prior to the completion of the earthen berm addition, a 30-inch diameter corrugated, galvanized steel pipe was attached to the decant sump tank manway to provide access to the decant sump tank. This pipe was designed to extend upward 33 feet to the top of the berm. As a result of the slumping of the first berm, the access pipe shifted and bent. Although this pipe provided access to the decant sump tank, no information exists to indicate that the level of the liquid in the decant sump tank was monitored prior to August, 1989.

In August of 1989, a monthly sampling program was initiated at the request of the U.S. EPA. As a result of this sampling activity, high concentrations of radionuclides were observed in the decant sump tank liquid. The contaminants found in the decant sump tank were similar to those found in the K-65 silo residue. These results supported the belief that the tank had not been cleaned of residues when the decant system was disconnected and the silo berms were constructed. The data from this sampling program was used to support the preparation of the RSE.

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Concerned about a potential release and subsoil contamination, an RSE was prepared to support DOE-FN in the determination of the need for the removal of this liquid from the decant sump tank. In response to the RSE, DOE-FN issued an Action Memorandum to the operating contractor to implement a removal action.

A Removal Action Work Plan (RAWP) was prepared in accordance with the Consent Agreement. The Consent Agreement requires that a work plan be submitted to the U.S. EPA for review and approval prior to the implementation of all removal actions. The U.S. EPA conditionally approved the submitted Removal Action Work Plan on January 10, 1991.

Results from the October 1990 preliminary (pre-removal action) sampling of the decant sump tank liquid (this sampling effort is separate from the monthly sampling program initiated in August, 1989) were evaluated prior to the initiation of the removal action. The preliminary analyses results (Attachment A) indicated that the trace volatile organic compounds detected were below regulatory concern, however, measurable concentrations of some heavy metals and radionuclides were observed. Throughout the removal action, management and control of the potentially hazardous liquid was performed according to all applicable, relevant and appropriate requirements (ARARs) identified for this removal action, in conjunction with FEMP hazardous waste management practices.

The constituents that were observed in the decant sump tank are defined as byproduct material, and therefore, excluded from Resource Conservation and Recovery Act (RCRA) regulations under 40 CFR 261.4(a)(4). The pitchblende ore contained heavy metal impurities that were native to the different regions (e.g. the Belgian Congo, Australia) that supplied the ore to the FEMP. When processed, these impurities were liberated from the rock matrix of the uranium ore. These naturally occurring heavy metal compounds, containing arsenic, cadmium, chromium, lead, selenium, and silver, were removed from the process material and collected as a constituent of the slurried residue. The process residues that were in the decant sump tank contained these liberated process impurities.

During the implementation phase of the removal action, approximately 10,000 gallons of sump liquid were removed from the decant sump tank and access piping and ultimately transferred to the FEMP wastewater treatment facilities for treatment. In order to determine the proper disposition of the material, samples for final analyses of the pumped liquid were required to be taken. The pumped liquid was handled, stored in Plant 2/3 Refinery Tank F3E-408, and monitored, in accordance with hazardous waste management procedures. Final analyses (Attachment B) of the pumped liquid from the decant sump tank yielded results which showed that all volatile organics and semi-volatile organic compounds were below concentrations of regulatory concern, however, as expected a number of heavy metals were present, as byproduct residue impurities, in levels exceeding the regulatory limits.

Meeting the FEMP wastewater pre-treatment standards (e.g. volatile organic or

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semi-volatile organic constituents at levels below regulatory concern), the liquid was treated in the existing FEMP wastewater treatment facilities using approved treatment procedures for heavy metals and radionuclides. After treatment the wastewater was discharged through a National Pollutant Discharge Elimination System monitoring point. This treatment was completed on May 12, 1992.

As a follow up to the removal action, the level of the liquid in the decant sump tank has been measured on a routine basis to observe the expected rainwater infiltration into the decant sump system. Approximately one (1) year after the completion of the removal action, the liquid level in the decant sump tank has risen approximately three (3) feet. This corresponds to approximately 3,000 gallons of liquid and sludge currently estimated to be present in the K-65 decant sump tank. These results were expected as the underdrain system is still intact. The monitoring of the decant sump tank liquid level will continue until final remediation.

The point at which further pumping of the liquid in the decant sump tank should be initiated to prevent potential release of the liquid into the environment has been estimated, using best engineering judgement, to be in the order of 75 to 80% of the 9,000-gallon tank capacity.

REMOVAL ACTION IMPLEMENTATION

In 1964, the decant portion of the system was disconnected in conjunction with the placement of the earthen berms around the silos, but the underdrain system was left intact. This underdrain system was designed to collect potential leakage from the K-65 silos or drainage from rainwater and groundwater infiltration. The collected liquid from the underdrain system is delivered to the decant sump tank via underground pipe. Also at this time, access was provided to the decant sump tank by attaching a 30-inch diameter corrugated galvanized steel pipe to the manway of the decant sump tank. The pipe extends 33 feet upward to the top of the berm. This access pipe was bent by slumping of the earthen berm from 1964, and therefore, currently provides only limited access for monitoring.

During the routine monthly sampling of the decant sump tank (initiated in August of 1989), standing water was observed inside the corrugated galvanized steel pipe, approximately 25 feet above the decant sump tank. Concerned about a potential release and subsoil contamination, the DOE-FN initiated an RSE.

Consistent with Section 300.415 of the National Oil and Hazardous Substances Contingency Plan (NCP), two factors were presented in the RSE for DOE-FN to consider in determining the appropriateness of such a removal action.

- 1) Actual or potential contamination of drinking water supplies or sensitive ecosystems.
- 2) Hazardous substances or pollutants or contaminants in drums, barrels, tanks, or other bulk storage containers, that may pose a threat of release.

On Completion of their review of the RSE, DOE-FN as the lead agency, determined that the removal of liquid from the K-65 decant sump tank was an appropriate time-critical removal action which followed the guidelines of the NCP. On August 24, 1990, DOE-FN issued an Action Memorandum which directed that a Removal Action Work Plan be prepared in accordance with the Consent Agreement. The Consent Agreement requires that a work plan be submitted to the U.S. EPA for review and approval prior to the implementation of each removal action. The U.S. EPA conditionally approved the DOE-FN submitted Removal Action Work Plan on January 10, 1991.

The scope of the K-65 Decant Sump Tank Removal Action consisted of removing the liquid from the K-65 decant sump tank, dispositioning the removed liquid, and treating of the liquid at the existing FEMP wastewater treatment facility. Management and control of the liquid was in accordance with the FEMP radiological and hazardous waste management practices.

The work plan identified the support activities which included the planning activities, the additional data/studies, the design activities, and the

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training requirements that were necessary to perform the removal action. Field actions were outlined to direct the implementation of the removal action and the treatment process.

During the implementation phase of the removal action, approximately 10,000 gallons of sump liquid, taken from the decant sump tank and access piping by a submersible pump, was collected by a tank-trailer and transported to the FEMP wastewater treatment facilities for eventual treatment. Multiple trips to the treatment facility were required to be taken by the 5000-gallon capacity tank-trailer. A representative sample of the liquid for each load of liquid transferred was taken from the tank-trailer to analytically test for organics, heavy metals and radionuclides prior to wastewater treatment. Approximately 300 gallons of residue sludge, which originated from the original decant operations, is estimated to remain in the decant sump tank itself.

The results of the both the pre- and post-removal action analyses yielded trace volatile and semi-volatile organic compounds at levels below regulatory concern. Measurable concentrations, however, of the radionuclides isotopes uranium, radium, thorium, and lead were observed in the samples. These are the same byproducts that exist in the residues that are contained in the K-65 silos. Those heavy metal concentrations that were detected in the pre-removal action analyses (Attachment A), were similarly duplicated in the final post-removal action sample analyses (Attachment B).

Since sampling and analysis yielded favorable results for heavy metal and radionuclide treatment, the pumped liquid that was stored in Plant 2/3 Refinery Tank F3E-408 was neutralized and transferred by pipeline to the Plant 8 wastewater treatment facility. Solids were removed from the wastewater by filtration.

The filtrate was pumped to the General Sump and segregated for nitrate treatment. The filtrate was then pumped to the Bionitrification Surge Lagoon where additional solids removal by settling occurred. The filtrate was then pumped into the Bionitrification Bioreactors for nitrate reduction. Meeting the FEMP wastewater discharge standards, the filtrate was discharged to the Effluent Treatment System (ETS) for Biological Oxygen Demand and Total Suspended Solids control. It should be noted that the wastewater treatment for radionuclide removal is effective for all types of radionuclides, including the minute amount of Radium-226 detected by the pre-treatment, post-removal action sampling and analyses. The treated filtrate was then discharged from the ETS through a NPDES monitoring point, which is monitored routinely.

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SAMPLING AND ANALYSIS

Starting in August 1989, the liquid in the corrugated pipe above the sump tank was sampled and analyzed by FEMP personnel for radionuclides in order to support the development of the RSE. In addition, preliminary (pre-removal action) sampling and analyses was conducted in October 1990 to support the health and safety controls in the RAWP. The preliminary sampling analyses results are included as Attachment A. During the removal action (post-removal action), a representative sample from each load was taken from the tank-trailer prior to transferring it to Plant 2/3, where the liquid was stored in the Refinery Tank F3E-408. The sampling analyses results for each of the representative samples are included in Attachment B. The pumped liquid remained in storage until the sampling analyses results became available. An independent laboratory was used to support this phase of the work.

The types of radionuclides found in the decant sump tank were similar to those found in the K-65 residue. The maximum concentrations of the primary radionuclides of concern, as determined by sampling analysis, are: U-238 (26,000 pCi/L), U-234 (139 pCi/L), Ra-226 (1,200 pCi/L), Th-230 (<1 pCi), and Pb-210 (8,000 pCi/L). Consistent with the State of Ohio Proposed Amended Consent Decree (PACD), process residues found in the decant sump tank are by definition byproduct material, and therefore, excluded from RCRA regulations under 40 CFR 261.4(a)(4).

Preliminary sampling analysis (Attachment A) for heavy metals yielded results above regulatory levels for a number of heavy metals. The final metals analysis (Attachment B) obtained from the samples taken after the removal action and prior to treatment yielded similar results.

Sampling of both the wastewater during treatment, and the effluent discharged after treatment, was performed in accordance with the K-65 Decant Sump Tank Removal Action ARARs, FEMP policy and procedures, the FEMP Federal Facilities Compliance Agreement (FFCA), and the FEMP National Pollutant Discharge Elimination System Permit. All regulatory limits for wastewater discharge were met.

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HEALTH AND SAFETY PLAN

The task-specific Health and Safety Plan, which was prepared for implementation of this removal action was designed to protect personnel working under the Radiation Work Permit (RWP) from excessive exposure to both the penetrating radiation and the air borne particulate radiation found in the vicinity of the K-65 Silos. The penetrating radiation dose was determined to be in the range of 50-60 mrem/hr on the K-65 berm near the top of the corrugated pipe to about 0.6 mrem/hr at the inside of the fence to the west of the sump. The highest radiation readings in the area were 150 mrem/hr on contact with the silo domes. Furthermore, Radon from the K-65 Silos was identified as the constituent that exhibited the highest potential for personnel exposure.

An Exclusion Zone was established to demark the area of high potential hazard from radiological or chemical dangers. Access to the Exclusion Zone was restricted to trained and certified employees, as required by OSHA 29 CFR 1910.120. Personnel stay-times in the K-65 Area were controlled by radiological safety procedures to insure that personnel did not exceed the site administrative exposure control level of 150 mrem/week.

Air monitoring, targeted in the breathing zone, assured that contaminant concentrations did not exceed the concentrations specified by allowable exposure levels. The air monitoring program was designed to detect radon and radon progeny. Continuous radon gas monitoring was provided at the K-65 Area fenceline using alpha scintillation devices. Working level grab samples (Table 1), designed to detect radon progeny, were collected by a portable air pump and filter unit (breathing zone monitor). Working level concentrations are exposure concentration estimates for personnel working in the immediate area.

Radiation surveys were conducted at the beginning of the work. Personnel were required to wear direct reading dosimeters and to monitor radiation exposure periodically. Particulate radionuclides from the liquid were prevented from becoming airborne by use of HEPA-filtered vents on the receiving tanks. Monitoring was performed to insure that personnel were not excessively exposed above the allowable weekly dose.

All site personnel were trained in accordance with OSHA 29 CFR 1910.120, as well as, Westinghouse Environmental Management Company of Ohio (WEMCO) and DOE-FN site requirements.

TABLE 1
RADON GRAB SAMPLE SUMMARY

DATE	LOCATION	WORKING LEVEL	COMMENTS
06/26/91	Decant Sump Manway	0.199	None.
06/26/91	Decant Sump Manway	3.95	None.
06/19/91	Decant Sump Tank Valve	0.0001	Post Sampling Air Check.
06/19/91	Downwind of Decant Sump: Hatch of Tanker Truck	0.0001	Sample taken at hatch of tank truck while pumping.
06/18/91	Weston Road: Hatch of Tanker Truck	0.112	Sample taken at hatch of tank truck while pumping.
06/18/91	Top of Decant Sump Tank	8.87	None.
06/18/91	Weston Road: North of Silo 1	0.075	Downwind of Decant Sump Tank area.
06/18/91	Downwind of Decant Sump: Hatch of Tanker Truck	0.031	Taken within Exclusion Zone while pumping.
06/07/91	Decant Sump Area	0.287	None.
05/14/91	Decant Sump Tank Manway	5.138	None.
04/16/91	Downwind of Decant Sump Manway	0.007	None.
04/16/91	Tanker Hatch: East of Pressure Gauge	0.19	None.
04/16/91	Decant Sump Tank Manway	3.83	None.
04/16/91	Tanker Hatch: West of Silo 1	1.93	None.
04/16/91	Decant Sump Tank Manway	5.36	None.
04/16/91	RGM #2: Tanker Work Area	Not Detected	None.
04/16/91	Left Rear Truck Bumper: Work Area	Not Detected	None.
04/16/91	Van: 25' South of Tanker Work Area	Not Detected	None.
04/16/91	Ledge, Below Vent of Decant Sump	0.014	None.
04/16/91	4' North of Decant Sump Manway	1.62	None.
04/16/91	4' North of Decant Sump Manway	0.082	None.

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QUALITY ASSURANCE PLAN

The K-65 Decant Sump Tank Removal Action was conducted in accordance with the requirements of the overall quality assurance program at the FEMP which is described in the site Quality Assurance Plan, FMPC 2139. The Quality Assurance Plan is based on the criteria specified in ASME NQA-1, Federal EPA Guideline QAMS-005/80 and DOE Orders 5700.6 and 5400.1. Specific quality assurance requirements were incorporated into written and approved procedures and into personnel training. Periodic surveillance reports, performed by the FEMP operating contractor, verified that implementation of the K-65 Decant Sump Tank Removal Action complied with the Quality Assurance Plan.

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REGULATORY CONCERNS

The contents of Silos 1 and 2 are exempted from RCRA regulation by the U.S. EPA in 40 CFR 261.4(a)(4), which exclude byproduct material as defined by the Atomic Energy Act (AEA) of 1954, as amended, 42 USC 2011 et seq. (AEA). The material stored in the K-65 silos are tailings and/or residues produced by the extraction of uranium (10 CFR 962, 52 FR 15937), and therefore meet the exclusion by definition.

Byproduct material is expressly excluded from the definition of solid waste under federal law [40 USC 6903 (27)]. The material stored in the decant sump tank was defined as byproduct material under 42 USC 2011(e)(2). Since the contents of the tank were generated as the result of the extraction and/or concentration of processed uranium ore under 40 CFR 261.4(a)(4) and 10 CFR 962, the contents of the K-65 decant sump tank are exempt from RCRA regulation as a hazardous waste.

To support waste management activities, a list of potential ARARs (Attachment C) for the removal action was developed because the material exhibited the potential for heavy metals in quantities in excess of RCRA levels. Meeting the FEMP wastewater pre-treatment standards (e.g. volatile organic or semi-volatile organic constituents below levels of regulatory concern), the liquid was treated in the existing FEMP wastewater treatment facilities using approved treatment procedures for heavy metals and radionuclides. The NPDES regulatory requirements for FEMP wastewater discharge were met by the proper storage, treatment, and disposal activities performed in accordance with the requirements of CERCLA and DOE orders and procedures.

To fulfill the requirements of the National Environmental Policy Act (NEPA), a Categorical Exclusion Determination was generated and approved by DOE-HQ. The Categorical Exclusion was prepared in accordance with the September 7, 1990, Section D Amendment to the NEPA. Under this September 1990 amendment, removal actions under CERCLA do not require Environmental Assessments or Environmental Impact Statements. Prior to generating the Categorical Exclusion Determination, it was determined that this project did not threaten a violation of applicable statutory, regulatory, or permit requirements and that it would not affect "environmentally sensitive areas".

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FUTURE ACTIVITIES

Future planned work activities focus on the monitoring of the level of liquid in the K-65 decant sump tank. Routine decant sump liquid level measurements have been made by the FEMP maintenance and operations contractor since the removal action was completed. Rainwater infiltration into the decant sump system is expected to occur slowly over time. To date, the sump level has increased a total of 33.8 inches since June 1991. It has been observed that in the last six (6) months, the sump level has increased 27.8 inches of the total 33.8 inches recorded. Periodic monitoring will be performed until final remediation of the system is implemented.

The point at which further pumping of the liquid from the decant sump tank should be initiated to prevent release of the liquid into the environment has been estimated, using best engineering judgement, to be in the order of 75 to 80% of the 9,000-gallon tank capacity.

Any future pumping of the liquid from the decant sump tank should be initiated as a FEMP maintenance activity, in accordance with the existing procedures for the Decant Sump Tank RAWP. Also, if an abnormal event (e.g. a sudden drop in liquid level which would indicate a loss of tank integrity) occurs, an immediate evaluation would be made to determine whether pumping of the remaining liquid should be implemented.

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CONCLUSION

The K-65 Decant Sump Tank Removal Action successfully implemented an action to protect human health and the environment by mitigating the threat of a potential release of radiologically contaminated liquid to the subsoil in the area adjacent to the FEMP K-65 silos. The K-65 Decant Sump Tank Removal Action followed an approved work plan that outlined the planning and design requirements, the removal action implementation, the sampling analysis requirements, the health and safety procedures, and the quality assurance objectives. The decant sump tank, associated equipment, and any residues will be dispositioned as part of the final remediation of Operable Unit 4.

Because the liquid level in the decant sump tank is expected to be steadily increasing, post-removal action monitoring of the liquid level is required as a best management practice action, until final remediation is initiated. Future removal of the liquid in the K-65 decant sump tank may be required based on the monitoring results. If the tank approaches a full condition, defined as 75 to 80% capacity, prior to remediation, or, if an abnormal condition in tank level is observed, an evaluation of the condition will be made, and a recommendation will be forwarded to DOE-FN to authorize implementing any recommended actions.

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REFERENCES

A copy of each document associated with the K-65 Decant Sump Tank Removal Action has been compiled and placed in the FEMP Administrative Record, under the title, "Removal Action #9 - Decant Sump Tank". A copy of Removal Action #9 index for the Administrative Record is included as Attachment D.

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ATTACHMENT A

PRELIMINARY ANALYTICAL RESULTS
K-65 DECANT SUMP TANK REMOVAL ACTION

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12
PESTICIDE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO

PELKI

Lab Name: ITAS-KNOXVILLE

Contract: FERNALD

Lab Code: IT-MWL Case No.: 26377

SAS No.: NA SDG No.: 99403

Matrix: (soil/water) WATER

Lab Sample ID: Q2034

Sample wt/vol: 1000 (g/mL) ML

Lab File ID: _____

Level: (low/high) LOW

Date Received: NA

% Moisture: not dec. _____ dec. _____

Date Extracted: 11/16/90

Extraction: (sepf/cent/sonc) SEPF

Date Analyzed: 11/19/90

SFC Cleanup: (Y/N) N PH: ND

Dilution Factor: 1.0

CONCENTRATION UNITS:
(ug/L or ug/kg) UG/L

CAS NO.	COMPOUND	
319-84-6	alpha-BHC	0.0501U
319-85-7	beta-BHC	0.0501U
319-86-8	delta-BHC	0.0501U
58-89-9	gamma-BHC (lindane)	0.0501U
76-44-8	Heptachlor	0.0501U
309-00-2	Aldrin	0.0501U
1024-67-3	Heptachlor epoxide	0.0501U
959-98-8	Endosulfan I	0.101U
60-57-1	Dieldrin	0.101U
72-55-9	4,4'-DDE	0.101U
72-20-8	Endrin	0.101U
33213-65-9	Endosulfan II	0.101U
72-54-8	4,4'-DDD	0.101U
1031-07-8	Endosulfan sulfate	0.101U
50-29-3	4,4'-DDT	0.501U
72-43-5	Methoxychlor	0.101U
53494-70-5	Endrin ketone	0.501U
5103-71-9	alpha-chlordane	0.501U
5103-74-2	gamma-chlordane	1.01U
8001-35-2	Toxaphene	0.501U
12674-11-2	Aroclor-1016	0.501U
12104-28-2	Aroclor-1221	0.501U
12141-16-5	Aroclor-1232	0.501U
53469-21-9	Aroclor-1242	0.501U
12672-29-6	Aroclor-1248	1.01U
12097-69-1	Aroclor-1254	1.01U
12096-82-5	Aroclor-1260	

FORM I PEST

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EPA 821

EPA 821-R-92-010

EPA 821-R-92-010

PESTICIDE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

99403

Lab Name: ITAS-KNOXVILLEContract: FERNALDLab Code: IT-MWL Case No.: 16377SAS No.: NASDG No.: 99403Matrix: (soil/water) WATERLab Sample ID: FP2552Sample wt/vol: 1000 (g/mL) ML

Lab File ID: _____

Level: (low/med) LOWDate Received: 11/01/90

Moisture: not dec. _____ dec. _____

Date Extracted: 11/16/90Extraction: (sepf/cont/sonc) SEPTDate Analyzed: 11/19/90GC Cleanup: (Y/N) N pH: 6.0Dilution Factor: 1.0CONCENTRATION UNITS:
(ug/L or ug/Kg) UG/L

CAS NO.

COMPOUND

319-84-6	alpha-BHC	0.0501U
319-85-7	beta-BHC	0.0501U
319-86-8	gamma-BHC	0.0501U
58-89-9	gamma-BHC (lindane)	0.0501U
75-44-8	Heptachlor	0.0501U
309-00-2	Aldrin	0.0501U
1024-57-3	Heptachlor epoxide	0.0501U
959-98-6	Endosulfan I	0.101U
60-57-1	Dieldrin	0.101U
72-55-9	4,4'-DDE	0.101U
72-20-8	Endrin	0.101U
33323-68-9	Endosulfan II	0.101U
72-54-8	4,4'-DDD	0.101U
1031-07-8	Endosulfan sulfate	0.101U
50-29-3	4,4'-DDT	0.501U
72-43-6	Methoxychlor	0.101U
53494-70-5	Endrin ketone	0.501U
5103-71-9	alpha-Chlorazene	0.501U
5103-74-2	gamma-Chlorazene	1.01U
3001-35-2	Toxaphene	0.501U
12674-11-2	Aroclor-1016	0.501U
12674-28-2	Aroclor-1221	0.501U
12674-16-5	Aroclor-1232	0.221U
53469-21-9	Aroclor-1242	0.501U
12675-29-6	Aroclor-1248	0.0811U
12697-69-1	Aroclor-1254	1.01U
12696-82-5	Aroclor-1260	

FORM I PEST

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111-21-90 11:00PMT-12 P12
111-21-90 FERNOLD

EPA SAMPLE NO

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

SBLK82

Lab Name: ITAS-OAK RIDGE Contract: ADY
Lab Code: IT-MWL Case No.: 16377 SAS No.: NA SDG No.: 99403
Matrix: (soil/water) WATER Lab Sample ID: Q2031
Sample wt/vol: 1000 (g/mL) MY Lab File ID: Q2031B
Level: (low/med) LOW Date Received:
% Moisture: not dec. dec. Date Extracted: 11/15/90
Extraction: (Sep/Cont/Sonc) SEPF Date Analyzed: 11/19/90
GPC Cleanup: (Y/N) N PH: Dilution Factor: 1.0

CONCENTRATION UNITS:
(ug/L or ug/Kg) UG/L

CAS NO. COMPOUND

99-09-2	3-Nitroaniline	50	U
83-32-9	Acenaphthene	10	U
51-28-5	2,4-Dinitrophenol	50	U
100-02-7	4-Nitrophenol	50	U
132-64-9	Oibenzofuran	10	U
121-14-2	2,4-Dinitrotoluene	10	U
84-66-2	Diethylphthalate	10	U
7005-72-3	4-Chlorophenyl-phenylether	10	U
86-73-7	Fluorene	50	U
100-01-6	4-Nitroaniline	50	U
534-52-1	4,6-Dinitro-2-Methylphenol	10	U
86-30-6	N-Nitrosodiphenylamine (1)	10	U
101-55-3	4-Bromophenyl-phenylether	10	U
118-74-1	Hexachlorobenzene	50	U
87-86-5	Pentachlorophenol	10	U
85-01-8	Phenanthrene	10	U
120-12-7	Anthracene	10	U
84-74-2	Di-n-Butylphthalate	10	U
206-44-0	Fluoranthene	10	U
129-00-0	Pyrene	10	U
85-68-7	Butylbenzylphthalate	20	U
91-94-1	3,3'-Dichlorobenzidine	10	U
56-55-3	Benzo(a)Anthracene	10	U
218-01-9	Chrysene	10	U
117-81-7	bis(2-Ethylhexyl) Phthalate	10	U
117-84-0	Di-n-Octyl Phthalate	10	U
205-99-2	Benzo(b)Fluoranthene	10	U
207-08-9	Benzo(k)Fluoranthene	10	U
50-32-8	Benzo(a)Pyrene	10	U
193-39-5	Indeno(1,2,3-cd)Pyrene	10	U
53-70-3	Oibenz(a,n)Anthracene	10	U
191-24-2	Benzo(g,h,i)Perylene	10	U

(1) - cannot be separated from Diphenylamine

13
SEMI-VOLATILE ORGANICS ANALYSIS DATA SHEET
Lab Name: MISS-OAK RIDGE Case No.: 16117 SAS No.: NA SDG No.: 99403
Contract: ADP
Lab Sample ID: 02033 Lab File ID: 020318
Date Received: 11/15/90 Date Extracted: 11/15/90 Date Analyzed: 11/15/90
Extraction Factor: 1.0
Concentration Units: (ug/L or ug/kg) ug/L

Lab Name: MISS-OAK RIDGE Case No.: 16117 SAS No.: NA SDG No.: 99403
Lab Sample ID: 02033 Lab File ID: 020318
Date Received: 11/15/90 Date Extracted: 11/15/90 Date Analyzed: 11/15/90
Extraction Factor: 1.0
Concentration Units: (ug/L or ug/kg) ug/L

Lab Name: MISS-OAK RIDGE Case No.: 16117 SAS No.: NA SDG No.: 99403
Lab Sample ID: 02033 Lab File ID: 020318
Date Received: 11/15/90 Date Extracted: 11/15/90 Date Analyzed: 11/15/90
Extraction Factor: 1.0
Concentration Units: (ug/L or ug/kg) ug/L

CONCENTRATION UNITS:		COMPOUND		CAS NO.	
10	ug	108-95-2	Phenol	108-95-2	Phenol
10	ug	121-44-4	o-CHlorophenol	121-44-4	o-CHlorophenol
10	ug	95-37-8	2-CHlorophenol	95-37-8	2-CHlorophenol
10	ug	541-73-1	1,3-Dichlorobenzene	541-73-1	1,3-Dichlorobenzene
10	ug	106-46-7	1,4-Dichlorobenzene	106-46-7	1,4-Dichlorobenzene
10	ug	100-51-6	Benzyl Alcohol	100-51-6	Benzyl Alcohol
10	ug	95-50-1	1,2-Dichlorobenzene	95-50-1	1,2-Dichlorobenzene
10	ug	95-48-7	2-Methylphenol	95-48-7	2-Methylphenol
10	ug	108-60-1	o-CHloro(2-chloropropyl) Ether	108-60-1	o-CHloro(2-chloropropyl) Ether
10	ug	106-44-5	4-Methylphenol	106-44-5	4-Methylphenol
10	ug	621-64-7	N-Nitroso-Di-n-propylamine	621-64-7	N-Nitroso-Di-n-propylamine
10	ug	67-72-1	Hexachloroethane	67-72-1	Hexachloroethane
10	ug	98-95-3	Nitrobenzene	98-95-3	Nitrobenzene
10	ug	78-59-1	Isopropylene	78-59-1	Isopropylene
10	ug	88-75-5	2-Nitrophenol	88-75-5	2-Nitrophenol
10	ug	105-67-9	2,4-Dimethylphenol	105-67-9	2,4-Dimethylphenol
50	ug	65-65-0	Benzoic Acid	65-65-0	Benzoic Acid
10	ug	111-91-1	o-CHloro(2-chloroethoxy) Methane	111-91-1	o-CHloro(2-chloroethoxy) Methane
10	ug	120-63-2	2,4-Dichlorophenol	120-63-2	2,4-Dichlorophenol
10	ug	120-62-1	1,2,4-Trichlorobenzene	120-62-1	1,2,4-Trichlorobenzene
10	ug	91-20-3	Naphthalene	91-20-3	Naphthalene
10	ug	106-47-8	4-CHloraniline	106-47-8	4-CHloraniline
10	ug	87-58-3	Hexachlorocyclopentadiene	87-58-3	Hexachlorocyclopentadiene
10	ug	59-50-7	4-Chloro-3-Methylphenol	59-50-7	4-Chloro-3-Methylphenol
10	ug	91-57-6	2-Methylnaphthalene	91-57-6	2-Methylnaphthalene
10	ug	17-47-4	Hexachlorocyclopentadiene	17-47-4	Hexachlorocyclopentadiene
50	ug	38-06-2	2,4,6-Trichlorophenol	38-06-2	2,4,6-Trichlorophenol
50	ug	95-95-4	2,4,5-Trichlorophenol	95-95-4	2,4,5-Trichlorophenol
50	ug	91-58-7	2-Chloronaphthalene	91-58-7	2-Chloronaphthalene
10	ug	88-74-4	2-Nitraniline	88-74-4	2-Nitraniline
10	ug	121-11-3	Dimethyl Phthalate	121-11-3	Dimethyl Phthalate
10	ug	208-96-8	Acenaphthylene	208-96-8	Acenaphthylene
10	ug	606-20-2	2,6-Dinitrophenol	606-20-2	2,6-Dinitrophenol

3611

NOV 21 1992 10:03
SENT BY FAX 10/28/92FBI FERNANDO
11/21/92FBI BIR
11/21/9210
SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO

SBLX81

Lab Name: ITAS-OAK RIDGE Contract: ADY
Lab Code: IT-MWL Case No.: 15177 SAS No.: NA SDG No.: 99403
Matrix: (soil/water): WATER Lab Sample ID: 02007
Sample wt/vol: 1000 (g/mL) ML Lab File ID: 02007
Level: (low/med) LOW Date Received: _____
% Moisture: not dec. _____ dec. _____ Date Extracted: 11/05/90
Extraction: (SepF/Cont/Song) SEPF Date Analyzed: 11/19/90
GPC Cleanup: (Y/N) N PH: _____ Dilution Factor: 1.0

CONCENTRATION UNITS:
(ug/L or ug/Kg) UG/L

CAS NO.

COMPOUND

99-09-2	3-Nitroaniline	50	U
83-32-9	Acenaphthene	10	U
51-28-5	2,4-Dinitrophenol	50	U
100-02-7	4-Nitrophenol	50	U
132-64-9	Dibenzofuran	10	U
121-14-2	2,4-Dinitrotoluene	10	U
84-66-2	Diethylphthalate	10	U
7005-72-3	4-Chlorophenyl-pnenylether	10	U
86-73-7	Fluorene	10	U
100-01-6	4-Nitroaniline	50	U
534-52-1	4,6-Dinitro-2-Methyphenol	50	U
86-30-6	N-Nitrosodiphenylamine (1)	10	U
101-55-3	4-bromophenyl-pnenylether	10	U
118-74-1	Hexachlorobenzene	10	U
87-86-5	Pentachlorophenol	50	U
85-01-8	Phenanthrene	10	U
120-12-7	Anthracene	10	U
84-74-2	Di-n-Butylphthalate	10	U
206-44-0	Fluoranthene	10	U
129-00-0	Pyrene	10	U
85-68-7	Butylbenzylphthalate	10	U
91-94-1	3,3'-Dichlorobenzidine	20	U
36-55-3	Benzo(a)Anthracene	10	U
218-01-9	Chrysene	10	U
117-81-7	bis(2-Ethylhexyl) Phthalate	10	U
117-84-0	Di-n-Octyl Phthalate	10	U
205-99-2	Benzo(b)Fluoranthene	10	U
207-08-9	Benzo(k)Fluoranthene	10	U
50-32-8	Benzo(a)Pyrene	10	U
193-39-5	Indeno(1,2,3-cd)Pyrene	10	U
53-70-3	Dibenz(a,h)Anthracene	10	U
191-24-2	Benzo(g,h,i)Perylene	10	U

(1) - Cannot be separated from Diphenylamine

3611

13
SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE N°

SBLKB1

Lab Name: WTAS-OAK RIDGE Contract: ADV
Lab Code: WT-MWL Case No.: 16377 SAS No.: NA SDG No.: 99403
Matrix: (soil/water) WATER Lab Sample ID: Q2007
Sample wt/vol: 1000 (g/mL) ML Lab File ID: Q2007
Level: (Low/med) LOW Date Received: _____
% Moisture: not dec. _____ dec. _____ Date Extracted: 11/05/90
Extraction: (Sepf/Cont/Sonc) SEPF Date Analyzed: 11/19/90
GPC Cleanup: (Y/N) N pH: _____ Dilution Factor: 1.0

CONCENTRATION UNITS:
(ug/L or ug/Kg) UG/L

CAS NO.	COMPOUND		
108-95-2	Phenol	10	U
111-44-4	bis(2-Chloroethyl) Ether	10	U
95-57-8	2-Chlorophenol	10	U
541-73-1	1,3-Dichlorobenzene	10	U
106-46-7	1,4-Dichlorobenzene	10	U
100-51-6	Benzyl Alcohol	10	U
95-50-1	1,2-Dichlorobenzene	10	U
95-48-7	2-Methylphenol	10	U
103-60-1	bis(2-Chloroisopropyl) Ether	10	U
106-44-5	4-Methylphenol	10	U
621-64-7	N-Nitroso-Di-n-Propylamine	10	U
67-72-1	Hexachloroethane	10	U
98-95-3	Nitrobenzene	10	U
78-59-1	Isoproporene	10	U
88-75-5	2-Nitrophenol	10	U
105-67-9	2,4-Dimethylphenol	50	U
65-85-0	Benzoic Acid	10	U
111-91-1	bis(2-Chloroethoxy) Methane	10	U
120-83-2	2,4-Dichlorophenol	10	U
120-82-1	1,2,4-Trichlorobenzene	10	U
91-20-3	Napthalene	10	U
106-47-8	4-Chloroaniline	10	U
87-68-3	Hexachlorobutadiene	10	U
59-50-7	4-Chloro-3-Methylphenol	10	U
91-57-6	2-Methylnapthalene	10	U
77-47-4	Hexachlorocyclopentadiene	10	U
38-06-2	2,4,6-Trichlorophenol	50	U
95-95-4	2,4,5-Trichlorophenol	10	U
91-58-7	2-Chloronapthalene	50	U
98-74-4	2-Nitroaniline	10	U
131-11-3	Dimethyl Phthalate	10	U
208-96-8	Acenaphthylene	10	U
606-20-2	2,6-Dinitrotoluene		

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11/21/92 11:10PM1C
SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

99403R

Lab Name: MTAS-OAK RIDGE Contract: ADV
Lab Code: MT-MWL Case No.: 16177 SAS No.: NA SDG No.: 99403
Matrix: (soil/water): WATER Lab Sample ID: FF2152
Sample wt/vol: 1000 (g/mL) ML Lab File ID: FF2152R
Level: (low/med) LOW Date Received: 11/01/90
% Moisture: not dec. dec. Date Extracted: 11/15/90
Extraction: (SepF/Cont/Sonc) SEPF Date Analyzed: 11/19/90
GPC Cleanup: (Y/N) N PH: Dilution Factor: 1.0

CONCENTRATION UNITS:
(ug/L or ug/Kg) UG/L

CAS NO. COMPOUND

99-09-2	3-Nitroaniline	50	U
83-32-9	Acanaphthene	10	U
51-28-5	2,4-Dinitrophenol	50	U
100-02-7	4-Nitrophenol	50	U
132-64-9	Dibenzofuran	10	U
121-14-2	2,4-Dinitrotoluene	10	U
84-66-2	Diethylphthalate	10	U
7005-72-3	4-Chlorophenyl-phenylether	10	U
86-73-7	Fluorene	50	U
100-01-6	4-Nitroaniline	50	U
534-52-1	4,6-Dinitro-2-Methylphenol	10	U
36-30-6	4-Nitrosodiphenylamine (1)	10	U
101-55-3	4-Bromophenyl-phenylether	10	U
118-74-1	Hexachlorobenzene	10	U
37-86-5	Pentachlorophenol	50	U
85-01-8	Phenanthrene	10	U
120-12-7	Anthracene	10	U
84-74-2	Di-n-Butylphthalate	10	U
206-44-0	Fluoranthene	10	U
129-00-0	Pyrene	10	U
85-68-7	Butylbenzylphthalate	20	U
91-94-1	3,3'-Dichlorobenzidine	10	U
56-55-3	Benzo(a)Anthracene	10	U
218-01-9	Chrysene	10	U
117-81-7	bis(2-Ethylhexyl) Phthalate	10	U
117-84-0	Di-n-Octyl Phthalate	10	U
205-99-2	Benzo(b)Fluoranthene	10	U
207-08-9	Benzo(k)Fluoranthene	10	U
50-32-8	Benzo(a)Pyrene	10	U
193-39-5	Indeno(1,2,3-cd)Pyrene	10	U
53-70-3	Dibenz(a,h)Anthracene	10	U
191-24-2	Benzo(g,h,i)Perylene	10	U

(1) - Cannot be separated from Diphenylamine

Revision 0
August 1992
3611

ENVIRONMENTAL
HEALTH SYSTEMS

131 FERNOLD
11-21-90 12:10PM

744 526
11/27/91 FERNOLD

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO

99403R

Lab Name: ITAS-OAK RIDGE Contract: ADV
Lab Code: IT-MWL Case No.: 15157 SAS No.: NA SDG No.: 99403
Matrix: (soil/water) WATER Lab Sample ID: ST2552
Sample wt/vol: 1000 (g/mL) ML Lab File ID: ST2552R
Level: (low/med) LOW Date Received: 11/01/90
% Moisture: not dec. dec. Date Extracted: 11/15/90
Extraction: (SepF/Cont./Sonic) SEP Date Analyzed: 11/19/90
GFC Cleanup: (Y/N) N pH: Dilution Factor: 1.0

CONCENTRATION UNITS:
(ug/L or ug/Kg) ug/L

CAS NO.

COMPOUND

108-95-2	Phenol	10	U
111-44-4	bis(2-Chloroethyl) Ether	10	U
95-57-8	2-Chlorophenol	10	U
541-73-1	1,3-Dichlorobenzene	10	U
106-46-7	1,4-Dichlorobenzene	10	U
100-51-6	Benzyl Alcohol	10	U
95-50-1	1,2-Dichlorobenzene	10	U
95-48-7	2-Methylphenol	10	U
108-60-1	bis(2-Chloroisopropyl) Ether	10	U
106-44-5	4-Methylphenol	10	U
621-54-7	N-Nitroso-Di-n-Propylamine	10	U
67-72-1	Hexachlorocyclohexane	10	U
98-95-3	Nitrobenzene	10	U
73-59-1	Isophorone	10	U
88-75-5	2-Nitrophenol	10	U
105-67-9	2,4-Dimethylphenol	50	U
65-35-0	Benzoic Acid	10	U
111-91-1	bis(2-Chloroethoxy) Methane	10	U
120-83-2	2,4-Dichlorophenol	10	U
120-82-1	1,2,4-Trichlorobenzene	10	U
91-20-3	Naphthalene	10	U
106-47-8	4-Chloroaniline	10	U
37-68-3	Hexachlorocyclopentadiene	10	U
59-50-7	4-Chloro-3-Methylphenol	10	U
91-57-6	2-Methylnaphthalene	10	U
77-47-4	Hexachlorocyclopentadiene	10	U
38-06-2	2,4,6-Trichlorophenol	50	U
95-95-4	2,4,5-Trichlorophenol	10	U
91-58-7	2-Chloronaphthalene	50	U
29-74-4	2-Nitroaniline	10	U
131-11-3	Dimethyl Nthalate	10	U
208-96-8	Acanaphthylene	10	U
606-20-2	2,6-Dinitrotoluene	10	U

Revision 0
August 1992
3611

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111-21-50 12:06PM

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12919-4081 FERNALD

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

99403

Lab Name: TTAS-OAK RIDGE

Contract: ADV

Lab Code: TT-MWL

Case No.: 15177

SAS No.: NA

SDG No.: 99403

Matrix: (soil/water) WATER

Lab Sample ID: FF2332

Sample wt/vol: 500 (g/mL) ML

Lab File ID: FF2332

Level: (low/med) LOW

Date Received: 11/01/90

% Moisture: not dec. dec.

Date Extracted: 11/05/90

Extraction: (Sep/Cont/Song) SDPF

Date Analyzed: 11/19/90

GPC Cleanup: (Y/N) N PH:

Dilution Factor: 1.0

CONCENTRATION UNITS:
(ug/L or ug/Kg) UG/L

CAS NO.	COMPOUND		
99-09-2	3-Nitroaniline	100	U
83-32-9	Acenaphthene	20	U
51-28-5	2,4-Dinitrophenol	100	U
100-02-7	4-Nitrophenol	100	U
132-64-9	Dibenzofuran	20	U
101-14-2	2,4-Dinitrotoluene	20	U
84-66-2	Diethylphthalate	20	U
7005-72-3	4-Chlorophenyl-phenylether	20	U
86-73-7	Fluorene	100	U
100-01-6	4-Nitroaniline	100	U
534-52-1	4,6-Dinitro-2-Methylphenol	20	U
86-30-6	N-Nitrosodiphenylamine (1)	20	U
101-55-3	4-Bromophenyl-phenylether	20	U
118-74-1	Hexachlorobenzene	100	U
87-86-5	Pentachlorophenol	20	U
85-01-8	Phenanthrene	20	U
120-12-7	Anthracene	20	U
84-74-2	01-n-Butylphthalate	20	U
206-44-0	Fluoranthene	20	U
129-00-0	Pyrene	20	U
85-68-7	Butylbenzylphthalate	40	U
91-94-1	3,3'-Dichlorobenzidine	20	U
56-55-3	Benzo(a)Anthracene	20	U
218-01-9	Chrysene	20	U
117-81-7	Bis(2-Ethylhexyl) Phthalate	20	U
117-84-0	01-n-Octyl Phthalate	20	U
205-99-2	Benzo(b)Fluoranthene	20	U
207-08-9	Benzo(k)Fluoranthene	20	U
50-32-8	Benzo(a)Pyrene	20	U
193-39-5	Indeno(1,2,3-cd)Pyrene	20	U
51-70-3	Dibenz(a,h)Anthracene	20	U
191-24-2	Benzo(g,h,i)Perylene	20	U

1) - Cannot be separated from Diphenylamine

3611

NOV 21 1992 10:15
SEM VOLATILE ORGANICS181 FERNOLI
11/21/92 10:00 AM114 207
11/21/92 10:00 AM18
SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

99403

Lab Name: ITAS-OAK RIDGEContract: ADVLab Code: W-MWLCase No.: 15177SAS No.: NASDG No.: 99403Matrix: (soil/water) WATERLab Sample ID: FF2552Sample wt/vol: 500 (g/mL) MLLab File ID: FF2552Level: (low/med) LOWDate Received: 11/01/92Moisture: not dec. dec.Date Extracted: 11/05/92Extraction: (SepF/Cont/Sonc) SEPFDate Analyzed: 11/19/92GPC Cleanup: (Y/N) N pH: Dilution Factor: 1.0CONCENTRATION UNITS:
(ug/L or ug/Kg) UG/L

CAS NO.

COMPOUND

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) <u>UG/L</u>	
108-95-2	Phenol	20	U
122-44-4	bis(2-Chloroethyl) Ether	20	U
95-57-8	2-Chlorophenol	20	U
541-73-1	1,3-Dichlorobenzene	20	U
106-46-7	1,4-Dichlorobenzene	20	U
100-51-6	Benzyl Alcohol	20	U
95-50-1	1,2-Dichlorobenzene	20	U
95-48-7	2-Methylphenol	20	U
108-60-1	bis(2-Chloroisopropyl) Ether	20	U
106-44-5	4-Methylphenol	20	U
621-64-7	N-Nitroso-Di-n-Propylamine	20	U
67-72-1	Hexachloroethane	20	U
98-95-3	Nitrobenzene	20	U
78-59-1	Isopropene	20	U
88-75-5	2-Nitrophenol	20	U
105-67-9	2,4-Dimethylphenol	4	U
65-85-0	benzoic Acid	20	U
122-91-1	bis(2-Chloroethoxy) Methane	20	U
120-83-2	2,4-Dichlorophenol	20	U
120-82-1	1,2,4-Trichlorobenzene	20	U
91-20-3	Napthalene	20	U
106-47-6	4-Chloroaniline	20	U
87-56-3	Hexachlorocyclopentadiene	20	U
59-50-7	4-Chloro-3-Methylphenol	20	U
91-57-6	2-Methylnapthalene	20	U
77-47-4	Hexachlorocyclopentadiene	20	U
88-06-2	2,4,6-Trichlorophenol	100	U
95-55-4	2,4,5-Trichlorophenol	20	U
91-58-7	2-Chloronapthalene	100	U
88-74-4	2-Nitroaniline	20	U
131-11-3	Dimethyl Phthalate	20	U
208-96-8	Acenapthylene	20	U
606-20-2	2,6-Dinitrotoluene	20	U

1/87 R

3611

ON 10 1992 11:13
SENT BY FAX 10/13/92

101 FERNALD

111-15-92

11/15/92

107 FEE

11/15/92 FERNALD

11-1

U.S. EPA - CDP

3
BLANKS

Lab Name: IT_OAK_RIDGE

Contract: FERNALD

Lab Code: ITXWL

Case No.: 16377

SAS No.:

SDG No.: 99403

Preparation Blank Matrix (soil/water): WATER

Preparation Blank Concentration Units (ug/L or ug/kg): ug/L

Analyte	Initial Calib. Blank (ug/L)	C	Continuing Calibration Blank (ug/L)					Prepa- ration Blank	C	X
			1	2	3	4	5			
Aluminum	50.0		50.0	50.0	50.0	50.0	50.0	50.0		
Antimony	10.0		10.0	10.0	10.0	10.0	10.0	10.0		
Arsenic	50.0		50.0	50.0	50.0	50.0	50.0	50.0		
Barium	2.0		2.0	2.0	2.0	2.0	2.0	2.0		
Beryllium	2.0		2.0	2.0	2.0	2.0	2.0	2.0		
Cadmium	2.0		2.0	2.0	2.0	2.0	2.0	2.0		
Calcium	2.0		2.0	2.0	2.0	2.0	2.0	2.0		
Chromium	2.0		2.0	2.0	2.0	2.0	2.0	2.0		
Cobalt	2.0		2.0	2.0	2.0	2.0	2.0	2.0		
Copper	2.0		2.0	2.0	2.0	2.0	2.0	2.0		
Iron	2.0		2.0	2.0	2.0	2.0	2.0	2.0		
Lead	2.0		2.0	2.0	2.0	2.0	2.0	2.0		
Magnesium	2.0		2.0	2.0	2.0	2.0	2.0	2.0		
Manganese	2.0		2.0	2.0	2.0	2.0	2.0	2.0		
Mercury	2.0		2.0	2.0	2.0	2.0	2.0	2.0		
Nickel	2.0		2.0	2.0	2.0	2.0	2.0	2.0		
Potassium	2.0		2.0	2.0	2.0	2.0	2.0	2.0		
Selenium	2.0		2.0	2.0	2.0	2.0	2.0	2.0		
Silver	2.0		2.0	2.0	2.0	2.0	2.0	2.0		
Sodium	2.0		2.0	2.0	2.0	2.0	2.0	2.0		
Thallium	2.0		2.0	2.0	2.0	2.0	2.0	2.0		
Vanadium	2.0		2.0	2.0	2.0	2.0	2.0	2.0		
Zinc	2.0		2.0	2.0	2.0	2.0	2.0	2.0		
Cyanide	2.0		2.0	2.0	2.0	2.0	2.0	2.0		

PRELIMINARY FORM 112 - IN 7/82

3611

DU 12 199 11117 11117 FERNALD
SENT BY AIR 11/01/90

EST 824

11/15/90 11/15/90 FERNALD

12 3

U.S. EPA - CLF

INORGANIC ANALYSES DATA SHEET

EPA SAMPLE NO.

99403

NAME: IT_OAK_RIDGE

Contract: FERNALD

Case No.: 16377

SAS No.:

SDG No.: 99403

Matrix (soil/water): WATER

Lab Sample ID: FT 2543

Level (low/med):

Date Received: 11/01/90

Residue:

0.0

Concentration Units (ug/L or mg/kg dry weight): CG/L

CAS No.	Analyte	Concentration	C	Q	X
7429-90-3	ALUMINUM	16200			
7440-36-0	ANTIMONY	189			
7440-38-2	ARSENIC	855			
7440-39-3	BARIUM	683			
7440-41-7	BERYLLIUM	1.6			
7440-43-9	CADMIUM	18.4			
7440-70-2	CALCIUM	136000			
7440-47-3	CHROMIUM	417			
7440-48-4	COBALT	1660			
7440-50-8	COPPER	887			
7439-89-6	IRON	70100			
7439-92-1	LEAD	19000			
7439-95-4	MAGNESIUM	57200			
7439-96-5	MANGANESE	1620			
7439-97-6	MERCURY	0.28 U			
7440-02-0	NICKEL	2330			
7440-09-7	POTASSIUM	18000			
7782-49-2	SELENIUM	5530			
7440-12-4	SILVER	182			
7440-23-5	SODIUM	100 U			
7440-28-0	THALLIUM	2.0 U			
7440-62-2	VANADIUM	311			
7440-66-6	ZINC	11300			
	CYANIDE	462			

Color Before: GREEN

Clarity Before: OPAQUE

Texture: N/A

Color After: YELLOW

Clarity After: CLEAR

Artifacts: YES

Comments:

GRASS AND BUGS WERE PRESENT IN SAMPLE. SAMPLE WAS FLUORESCENT GREEN.
FT 2542 FOR HG IS THE SAME AS FT 2543.
FT 2541 FOR CN IS THE SAME AS FT 2543.

FORM I - IN

7/88

3611

YOU IS 120 11117 431 FERNALD 557 203
SENT BY: 11/01/90 51257 1 11/01/90 51257 1 11/01/90 51257 1

STAR-MW098201

WY CHEMISTRY

Page 01

PROJECT CODE: ADV 36577

DATE RECEIVED: 11/01/90

SAMPLE DESCRIPTION: K-65 Decane Tank

CONCENTRATION UNITS: mg/l

CURRENT #1: 99403
SAMPLE #1:
NH₃, TON, PO₄: FF2519
CL, FL, SO₄: FF2518
NO₃/PHENOL: FF2515/FF2514
SULFIDE: FF2516
TOC: FF2517
TOX: FF2518

RESULTS

	TEST DATE	ANAL DATE	FLANK	99403	
AMMONIA	11/08/90	11/08/90	0.10 U	12.6	
TON	11/08/90	11/08/90			
TL. PHOS.	11/14/90	11/14/90	0.02 U	8.13	
CHLORIDE	11/09/90	11/09/90	0.50 U	90.9	
FLUORIDE	11/14/90	11/14/90	0.10 U	18.7	
SULFATE	11/12/90	11/12/90	2.00 U	350	
NITRATE	11/07/90	11/07/90	0.10 U	881	
PHENOL	11/06/90	11/06/90	0.01 U	0.02	
SULFIDE	11/05/90	11/05/90	0.5 U	0.5 U	
TOC	11/07/90	11/07/90	1.00 U	108	
TOX	11/08/90	11/08/90	0.010 U	0.25	

REVIEWED BY:

REVIEWED BY:

3611

ENVIRONMENTAL PROTECTION AGENCY
U.S. DEPARTMENT OF AGRICULTURE

101 FERMIS
101-111-111

744 P03
101-111-111

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET
TENTATIVELY IDENTIFIED COMPOUNDS

EPA SAMPLE N

99403R

Lab Name: WAS-OAK RIDGE Contract: ADV
Lab Code: W-MWL Case No.: 16377 SAS No.: NA SDG No.: 99403
Matrix: (soil/water) WATER Lab Sample ID: FF2552
Sample wt/vol: 1000 (g/mL) ML Lab File ID: FF25529
Level: (low/med) LOW Date Received: 11/01/90
% Moisture: not dec. dec. Date Extracted: 11/15/90
Extraction: (Sepf/Cont/Sonc) SEPF Date Analyzed: 11/19/90
GPC Cleanup: (Y/N) N pH: --- Dilution Factor: 1.2

CONCENTRATION UNITS:
(ug/L or ug/Kg) UG/L

Number TICS found: 4

CAS NUMBER	COMPOUND NAME	RT	EST. CONC.	Q
1. 126-73-8	PHOSPHORIC ACID TRIBUTYL EST	17.44	140	J
2. 55591-17-8	S-INDACENE-1,7-DIONE, 2,3,5,	24.05	11	J
3. UNKNOWN		19.10	6.2	J
4. 62103-27-4	DECANE, 2,4,6-TRIMETHYL-	10.67	4.6	J

MS
11/20/90

3611

CU 15 100 11113
SENT BY: J. J. C. C. C.401 FERNFIELD
111-15-00EST 1986
1987-1991 FERNFIELD

12 5

VOLATILE ORGANICS ANALYSIS DATA SHEET

0000
EPA SAMPLE N.Lab Name: ITAS-OAK RIDGEContract: ADU

99402

Lab Code: 17-000Case No.: 16151SAS No.: NASDG No.: 99402Matrix: (soil/water) WATERLab Sample ID: 777101Sample wt/vol: 1.0 (g/mL) MLLab File ID: 777101Level: (low/med) LOWDate Received: 12/29/90Moisture: not dec. Date Analyzed: 12/29/90Container: (pack/cap) PACKDilution Factor: 1.0

CAS NO.

COMPOUND

CONCENTRATION UNITS:
(ug/L or ug/Kg) UG/L

Q

74-67-3	Chloroethane	10	Q
74-61-9	Bromoethane	10	Q
75-01-4	Vinyl Chloride	10	Q
75-00-3	Chloroethane	10	Q
75-09-2	Methylene Chloride	6	Q
67-64-1	Acetone	10	Q
75-15-0	Carbon Disulfide	2	Q
75-35-4	1,1-Dichloroethane	5	Q
75-34-3	1,2-Dichloroethane	5	Q
540-59-0	1,3-Dichloroethane (total)	5	Q
67-66-3	Chloroform	5	Q
107-06-2	1,2-Dichloroethane	5	Q
78-93-3	3-Pentanone	15	Q
71-55-6	1,1,1-Trichloroethane	5	Q
56-23-5	Carbon Tetrachloride	5	Q
108-05-4	Vinyl Acetate	10	Q
75-27-4	trans-1,2-Dichloroethane	5	Q
78-47-4	1,3-Dichloropropane	5	Q
10061-01-5	cis-1,3-Dichloropropane	5	Q
79-01-6	Trichloroethane	5	Q
124-46-1	Ortho-chloroethane	5	Q
79-00-6	1,1,2-Trichloroethane	5	Q
71-43-2	Gasoline	5	Q
10061-02-4	trans-1,3-Dichloropropane	5	Q
75-25-2	Styrene	5	Q
108-10-1	4-Methyl-2-Pentanone	15	Q
591-78-4	3-Hexanone	10	Q
127-18-4	Tetrachloroethane	5	Q
79-34-4	1,1,1,2-Tetrachloroethane	5	Q
108-68-3	Toluene	5	Q
108-90-7	Chlorobenzene	5	Q
100-41-4	Ethylbenzene	5	Q
100-42-5	Styrene	5	Q
1330-20-7	Total Xylenes	5	Q

FORM 1 VOA

1/87 Rev

3611

ON 10-10-92 11:15 AM 101 REPAID 157 207
SENT BY AIR MAIL 101-15-92 5:25 PM 1992-051 REPAID 10 5

00006
EPA SAMPLE NO

12
VOLATILE ORGANICS ANALYSIS DATA SHEET
TENTATIVELY IDENTIFIED COMPOUNDS

99402

Lab Name: WAS-OAK RIDGE Contract: AD7
Lab Code: WV-WVL Case No.: 15161 SAS No.: NA SDC No.: 99402
Matrix: (soil/water) WATER Lab Sample ID: WV7701
Sample wt/vol: 1.2 (g/mL) ML Lab File ID: WV7701R
Level: (LOV/USD) LOV Date Received: 10/25/90
% Moisture: not dtd. --- Date Analyzed: 10/29/90
Column (pack/cap) PACK Dilution Factor: 1.2

CONCENTRATION UNITS:
(ug/L or ug/Kg) ug/L

Number TICS found: 1

CAS NUMBER	COMPOUND NAME	RT	EST. CONC.	Q
1.	UNKNOWN	10.18	40	J
2.	UNKNOWN	17.80	11	J

PRELIMINARY

105
11-14-90

FORM I VOA-TIC

1/87 Re

3611

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YOU 15 1992 10:01
SENT BY: J. J. C. L.
101-15-90 5:00PM

657 928
101-15-90 5:00PM

00078
EPA SAMPLE NO.

12
VOLATILE ORGANICS ANALYSIS DATA SHEET
TENTATIVELY IDENTIFIED COMPOUNDS

78LXB1

Lab Name: 101-15-90 10:01 Contract: ADY
Lab Code: 101-15-90 Case No.: 16161 SAS No.: NA-101 SDG No.: 99402
Matrix: (soil/water) WATER Lab Sample ID: YBR1029
Sample wt/vol: 1.0 (g/mL) ML Lab File ID: YBR1029
Level: (low/high) LOW Date Received: 12/29/90
Moisture: not dec. --- Date Analyzed: 12/29/90
Column (pack/cap) PACK Dilution Factor: 1.0

CONCENTRATION UNITS:
(ug/L or ug/Kg) UG/L

Number TICs found: 1

CAS NUMBER	COMPOUND NAME	RT	EST. CONC.	Q

PRELIMINARY

101-15-90

FORM 1 VOA-TIC

1/87 R

ATTACHMENT B

3611

FINAL ANALYTICAL RESULTS
K-65 DECANT SUMP TANK REMOVAL ACTION

K-65 DECANT SUMP TANK
RADIOLOGICAL
ANALYTICAL DATA

3611

PARAMETERS	UNITS	99411 (4/9/91)	99412 (4/12/91)	99415 (4/16/91)	99416 (4/19/91)	99417	99
RADIOLOGICAL PARAMETERS							
Cesium 137	pCi/l	<20 (R)	<20 (R)	<20	NA	*	
Neptunium 237	pCi/l	<1.0 (R)	1.2	<1.0 (R)	NA	*	
Plutonium 238	pCi/l	1.0	<1.0	<1.0 (R)	NA	*	
Plutonium 239/240	pCi/l	<1.0	<1.0	<1.0	NA	*	
Radium 224	pCi/l	*	*	*	<27	<41	<
Radium 226	pCi/l	836 (R)	1120	797 (R)	937 (R)	128500	<
Radium 228	pCi/l	<3.0 (R)	4.81	<3.0	<76	<140	<
Ruthenium 106	pCi/l	<150 (R)	<150 (R)	<150	NA	*	
Strontium 90	pCi/l	<5.0 (R)	<5.0	6.47	NA	*	
Tecnetium 99	pCi/l	<30	<30	43.8	NA	*	
Thorium 228	pCi/l	<1.0	*	2.72 (R)	*	*	<
Thorium 230	pCi/l	<1.0 (R)	*	197 (R)	*	52130	*
Thorium 232	pCi/l	<1.0	*	<1.8	*	*	<
Total Thorium	pCi/l	<7.1 (D)	*	<16	*	*	<
Uranium 234	pCi/l	*	*	*	*	*	
Uranium 235/236	pCi/l	1310	1362.0 (R)	1074	*	*	
Uranium 238	pCi/l	26000	22490.0 (R)	20390	*	*	
Total Uranium	uCi/l	77400	75000	70400	*	<1255	

* = ANALYTES NOT LISTED IN DATABASE REPORT (JULY 1992)

K-65 DECANT SUMP TANK
GENERAL CHEMISTRY AND METAL
ANALYTICAL DATA

3611

PARAMETERS	UNITS	99411	99412	99415	99416	99417	99420
GENERAL CHEMISTRY							
Ammonia	mg/l	NA	11.5	27.4	0.1 (R)	NA	0.1
Chloride	mg/l	NA	103.4	107	93.2	NA	13.8
Flouride	mg/l	NA	22	20	120	NA	14
Hydrogen Ion	mg/l	NA	NA	NA	NA	NA	NA
Nitrate	mg/l	NA	884	791.2	2280	NA	30
Phenois	mg/l	NA	0.02	0.01	0.03	NA	0.01
Phosphorus (black.white)	mg/l	NA	3.03	2.72	1.53	NA	0.61
Phosphate as P	mg/l	NA	NA	NA	NA	NA	NA
Sulfate	mg/l	NA	9812.6	5348	4605	NA	55.5
Total Kjeldahl Nitrogen	mg/l	NA	NA	NA	NA	NA	NA
Total Organic Carbon	mg/l	NA	31.8	50	52.1	NA	2.01
Total Organic Halides	mg/l	NA	0.164	0.25	0.261	NA	Not Listed
Total Organic Nitrogen	mg/l	NA	24.55	Not Listed	0.309	NA	1.12
Sulfide	mg/l	NA	Not Listed	Not Listed	0.5	NA	0.5
METALS							
Aluminum	mg/l	1990	1940	1430	1830	NA	629
Antimony	mg/l	260	256	207	188	NA	31
Arsenic	mg/l	662	683	502	601	NA	2
Barium	mg/l	36.6	21.6	21.8	65.8	NA	26.1
Beryllium	mg/l	9.9	9.8	8.4	11.6	NA	2
Cadmium	mg/l	12	14.3	11.9	5.3	NA	2.1
Calcium	mg/l	4020	3520	6510	4870	NA	16500
Chromium	mg/l	377	404	311	430	NA	128
Cobalt	mg/l	70.8	74.3	66	79.9	NA	37.3
Copper	mg/l	99.4	184	87.8	120	NA	28.9
Cyanide	mg/l	Not Listed	318	429	311	NA	Not Listed
Iron	mg/l	284	309	272	1040	NA	3470
Lead	mg/l	182	138	213	602	NA	202
Magnesium	mg/l	3260	3190	4190	3490	NA	13400
Manganese	mg/l	28.6	51.6	29.3	50.7	NA	46.7
Mercury	mg/l	0.2	0.2	0.2	0.2	NA	0.2
Molybdenum	mg/l	7420	7740	6170	6260	NA	10
Nickel	mg/l	65.2	77.9	64.7	129	NA	116
Potassium	mg/l	36400	37600	28300	40100	NA	3400
Selenium	mg/l	5090	2900	5550	6020	NA	5.6
Silicon	mg/l	Not Listed	91800	68500	7330	NA	7310
Silver	mg/l	210	230	184	159	NA	18.8
Sodium	mg/l	557000	595000	190000	100	NA	11900
Thallium	mg/l	2	2	2	2	NA	2.4
Vanadium	mg/l	241	256	220	233	NA	20.4
Zinc	mg/l	80.6	30.9	67.3	486	NA	786

3611

K-65 DECANT SUMP TANK
ORGANIC COMPOUND
ANALYTICAL DATA

PARAMETERS	UNITS	99411	99412	99415	99416	99417	99420
		(4/9/91)	(4/12/91)	(4/16/91)	(4/19/91)		
VOLATILE ORGANICS							
1.1.1 - Trichloroethane	ug/l	NA	5	5	5	5	NA
1.1.2.2 - Tetrachloroethane	ug/l	NA	5	5	5	5	NA
1.1.2 - Trichloroethane	ug/l	NA	5	5	5	5	NA
1.1 - Dichloroethane	ug/l	NA	5	5	5	5	NA
1.1 - Dichloroethene	ug/l	NA	5	5	5	5	NA
1.2 - Dichloroethane	ug/l	NA	5	5	5	5	NA
1.2 - Dichloroethylene	ug/l	NA	5	5	5	5	NA
1.2 - Dichloropropane	ug/l	NA	10	10	5	10	NA
2 - Butanone	ug/l	NA	10	10	3	10	NA
2 - Hexanone	ug/l	NA	2	10	3	10	NA
4 - Methyl-2-pentanone	ug/l	NA	8	10	22	10	NA
Acetone	ug/l	NA	5	5	5	5	NA
Benzene	ug/l	NA	5	5	5	2	NA
Bromodichloromethane	ug/l	NA	5	5	5	5	NA
Bromoform	ug/l	NA	10	10	10	10	NA
Bromomethane	ug/l	NA	5	5	8	5	NA
Carbon tetrachloride	ug/l	NA	5	5	4	5	NA
Carbon disulfide	ug/l	NA	5	5	5	5	NA
Chlorobenzene	ug/l	NA	10	10	10	10	NA
Chloroethane	ug/l	NA	5	1	6	16	NA
Chloroform	ug/l	NA	10	10	10	10	NA
Chloromethane	ug/l	NA	5	5	5	5	NA
Dibromochloromethane	ug/l	NA	5	5	1	5	NA
Ethylbenzene	ug/l	NA	12	9	5	5	NA
Methylene chloride	ug/l	NA	5	5	5	5	NA
Styrene	ug/l	NA	3	5	5	5	NA
Tetrachloroethene	ug/l	NA	3	6	66	1	NA
Toluene	ug/l	NA	5	5	7	5	NA
Xylenes (total)	ug/l	NA	5	5	5	5	NA
Trichloroethene	ug/l	NA	10	10	10	10	NA
Vinyl acetate	ug/l	NA	10	10	10	10	NA
Vinyl chloride	ug/l	NA	5	5	5	5	NA
cis - 1.3 - Dichloropropene	ug/l	NA	5	5	5	5	NA
trans - 1.3 - Dichloropropene	ug/l	NA					
Pest/PCB							
1,4' - DDD	ug/l	NA	0.2	0.1	0.1	NA	
1,4' - DDE	ug/l	NA	0.2	0.1	0.1	NA	
1,4' DDT	ug/l	NA	0.2	0.1	0.1	NA	
Aldrin	ug/l	NA	0.1	0.05	0.05	NA	0
Aroclor - 1016	ug/l	NA	1	0.5	0.5	NA	
Aroclor - 1221	ug/l	NA	1	0.5	0.5	NA	
Aroclor - 1232	ug/l	NA	1	0.5	0.5	NA	
Aroclor - 1242	ug/l	NA	1.1	1.1	0.5	NA	
Aroclor - 1248	ug/l	NA	1	0.5	0.5	NA	

3611

K-65 DECANT SUMP TANK
ORGANIC COMPOUND
ANALYTICAL DATA

PARAMETERS	UNITS	99411 (4/9/91)	99412 (4/12/91)	99415 (4/16/91)	99416 (4/19/91)	99417	99420
Aroclor-1254	ug/l	NA	2	1	1	NA	
Aroclor-1260	ug/l	NA	2	1	1	NA	
Dieldrin	ug/l	NA	0.2	0.1	0.1	NA	0.1
Endosulfan II	ug/l	NA	0.2	0.1	0.1	NA	0.1
Endosulfan sulfate	ug/l	NA	0.2	0.1	0.1	NA	0.1
Endosulfan I	ug/l	NA	0.1	0.05	0.05	NA	0.05
Endrin	ug/l	NA	0.2	0.1	0.1	NA	0.1
Endrin ketone	ug/l	NA	0.2	0.1	0.1	NA	0.1
Heptachlor	ug/l	NA	0.1	0.05	0.05	NA	0.05
Heptachlor epoxide	ug/l	NA	0.1	0.05	0.05	NA	0.05
Methoxychlor	ug/l	NA	1	0.5	0.5	NA	0.5
Toxaphene	ug/l	NA	2	1	1	NA	
alpha-BHC	ug/l	NA	0.1	0.05	0.05	NA	0.05
alpha-Chlordane	ug/l	NA	1	0.5	0.5	NA	0.5
beta-BHC	ug/l	NA	0.1	0.05	0.05	NA	0.05
delta-BHC	ug/l	NA	0.1	0.05	0.05	NA	0.05
gamma-BHC (Lindane)	ug/l	NA	0.1	0.05	0.05	NA	0.05
gamma-Chlordane	ug/l	NA	1	0.5	0.5	NA	0.5
SEMI-VOLATILE ORGANICS							
4-Bromophenyl-phenylether	ug/l	NA	10	10	10	NA	10
1,2,4-Trichlorobenzene	ug/l	NA	10	10	10	NA	10
1,2-Dichlorobenzene	ug/l	NA	10	10	10	NA	10
1,3-Dichlorobenzene	ug/l	NA	10	10	10	NA	10
1,4-Dichlorobenzene	ug/l	NA	10	10	10	NA	10
2,4,5-Trichlorophenol	ug/l	NA	50	50	50	NA	50
2,4,6-Trichlorophenol	ug/l	NA	10	10	10	NA	10
2,4-Dichlorophenol	ug/l	NA	10	10	10	NA	10
2,4-Dimethylphenol	ug/l	NA	10	10	10	NA	10
2,4-Dinitrophenol	ug/l	NA	50	50	50	NA	50
2,4-Dinitrotoluene	ug/l	NA	10	10	10	NA	10
2,6-Dinitrotoluene	ug/l	NA	10	10	2	NA	10
2-Chloronaphthalene	ug/l	NA	10	10	10	NA	10
2-Chlorophenol	ug/l	NA	10	10	10	NA	10
2-Methylnaphthalene	ug/l	NA	10	10	10	NA	10
2-Methylphenol	ug/l	NA	10	10	10	NA	10
2-Nitroaniline	ug/l	NA	50	50	50	NA	50
2-Nitrophenol	ug/l	NA	10	10	110	NA	10
3,3'-Dichlorobenzidine	ug/l	NA	20	20	20	NA	20
3-Nitroaniline	ug/l	NA	50	50	50	NA	50
4,6-Dinitro-2-methylphenol	ug/l	NA	50	50	50	NA	50
4-Chloro-3-methylphenol	ug/l	NA	10	10	10	NA	10
4-Chloroaniline	ug/l	NA	10	10	10	NA	10
4-Chlorophenyl-phenylether	ug/l	NA	10	10	10	NA	10
4-Methylphenol	ug/l	NA	10	10	3	NA	10
4-Nitroaniline	ug/l	NA	50	50	50	NA	50

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K-65 DECANT SUMP TANK
ORGANIC COMPOUND
ANALYTICAL DATA

PARAMETERS	UNITS	99411 (4/9/91)	99412 (4/12/91)	99415 (4/16/91)	99416 (4/19/91)	99417	99420
4-Nitrophenol	ug/l	NA	1	1	74	NA	5
Acenaphthene	ug/l	NA	10	10	10	NA	1
Acenaphthylene	ug/l	NA	10	10	10	NA	1
Anthracene	ug/l	NA	10	10	10	NA	1
Benzo(a)anthracene	ug/l	NA	10	10	10	NA	1
Benzo(a)pyrene	ug/l	NA	10	10	10	NA	1
Benzo(b)fluoranthene	ug/l	NA	10	10	10	NA	1
Benzo(g,h,i)perylene	ug/l	NA	10	10	10	NA	1
Benzo(k)fluoranthene	ug/l	NA	10	10	10	NA	1
Benzoic acid	ug/l	NA	1	2	2	NA	5
Benzyl alcohol	ug/l	NA	10	10	10	NA	1
Butylbenzylphthalate	ug/l	NA	10	10	10	NA	1
Chrysene	ug/l	NA	10	10	10	NA	1
Di-n-butylphthalate	ug/l	NA	10	10	10	NA	1
Di-n-octylphthalate	ug/l	NA	10	10	10	NA	1
Dibenzo(a,h)anthracene	ug/l	NA	10	10	10	NA	1
Dibenzofuran	ug/l	NA	10	10	10	NA	1
Diethylphthalate	ug/l	NA	10	10	10	NA	1
Dimethyl phthalate	ug/l	NA	10	10	10	NA	1
Fluoranthene	ug/l	NA	10	10	10	NA	1
Fluorene	ug/l	NA	10	10	10	NA	1
Hexachlorobenzene	ug/l	NA	10	10	10	NA	1
Hexachlorobutadiene	ug/l	NA	10	10	10	NA	1
Hexachlorocyclopentadiene	ug/l	NA	10	10	10	NA	1
Hexachloroethane	ug/l	NA	10	10	10	NA	1
Indeno(1,2,3-cd)pyrene	ug/l	NA	10	10	10	NA	1
Isopnorne	ug/l	NA	10	10	10	NA	1
n-Nitrosodiphenylamine	ug/l	NA	10	10	10	NA	1
n-Nitroso-dipropylamine	ug/l	NA	10	10	10	NA	1
Naphthalene	ug/l	NA	10	10	10	NA	1
Nitrobenzene	ug/l	NA	10	10	10	NA	1
Pentachlorophenol	ug/l	NA	50	50	50	NA	1
Phenanthrene	ug/l	NA	10	10	10	NA	1
Phenol	ug/l	NA	10	10	6	NA	1
Pyrene	ug/l	NA	10	10	10	NA	1
bis(2-Chloroethoxy)methane	ug/l	NA	10	10	10	NA	1
bis(2-Chloroethyl)ether	ug/l	NA	10	10	10	NA	1
bis(2-Chloroisopropyl)ether	ug/l	NA	10	10	10	NA	1
bis(2-Ethylhexyl)phthalate	ug/l	NA	10	10	2	NA	1
3-Methylphenol	ug/l	NA	Not Listed	Not Listed	Not Listed	NA	Not Lis
4-Methylphenol	ug/l	NA	10	10	10	NA	1

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ATTACHMENT C

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POTENTIAL ARARs

K-65 DECANT SUMP TANK REMOVAL ACTION

FEED MATERIALS PRODUCTION CENTER

POTENTIAL ARARs

K-65 DECANT SUMP TANK REMOVAL ACTION

Chemical, Location, or Action	Citation	ARAR/TBC	Rationale for Implementation	Compliance Strategy
Radionuclide Emissions (except Radon)	40 CFR 61, Subpart H Emissions of radionuclides to the ambient air from DOE facilities shall not exceed those amounts that would cause any member of the public to receive in any year an effective dose equivalent of 10 mrem/yr.	Applicable	Plant 8 stack (equipped with a continuous sampler) could contribute to the dose to members of the public from the air pathway (NESHAPS).	NESHAP compliance for Plant 8 stack is documented in the FMPC sitewide U.S. EPA approved NESHAP document.
Radiation Doses, Levels and Concentrations in Restricted and Unrestricted Areas.	10 CFR 20.101-105 Radiation doses, levels and concentrations for restricted and unrestricted areas shall not exceed specified limits.	Relevant and Appropriate	Radioactive materials from this Removal Action could contribute radiation doses, levels, and concentrations to individuals in restricted and unrestricted areas, which could exceed the specified limits.	Protective measures will be implemented in accordance with the task specific Health and Safety Plan for the K-65 Decant Sump Tank Removal Action.
Treatment, Storage, and Handling	40 CFR 264, General Standards •40 CFR 264.13 (Waste Analysis) - Operators of a facility must obtain a detailed chemical and physical analysis of a representative sample of each hazardous waste to be treated, stored, or disposed of at the facility prior to treatment, storage, or disposal.	Relevant and Appropriate Relevant and Appropriate	The liquid removed from the K-65 decant sump tank must be handled, stored, and inspected with the liquid removed being managed as a hazardous waste.	As outlined in the Removal Action Work Plan, samples will be taken prior to the liquid being transferred to the tanks in Plant 2/3. Samples will be analyzed for ISIs.

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FEED MATERIALS PRODUCTION CENTER

POTENTIAL ARARS

K-65 DECANT SUMP TANK REMOVAL ACTION

Chemical, Location, or Action	Citation	ARAR/TBC	Rationale for Implementation	Compliance Strategy
	<p>•40 CFR 264.14 (Security) operators of a facility must prevent the unknowing or unauthorized entry of persons or livestock into the active portion of the facility, maintain a 24-hour surveillance system, or surround the facility with a controlled access barrier and maintain appropriate warning signs at facility approaches.</p>	Relevant and Appropriate		In addition to the FMPC sitewide security measures, the specific access control measures for the K-65 Decant Sump Tank Removal Action are outlined in the task specific Health and Safety Plan, section 6.1.
	<p>•40 CFR 264.15 (Inspections) Operators of a facility must develop a schedule and regularly inspect monitoring equipment, safety and emergency equipment, security devices and operating and structural equipment that are important to preventing, detecting or responding to environmental or human health hazards, promptly or immediately remedy defects, and maintain an inspection log.</p>	Relevant and Appropriate		Inspections of Plant 2/3 storage area and the FMPC water treatment facilities will be in accordance with the FMPC Waste Management Plan, the Waste Analysis Plan, and Standard Operating Procedures.

FEED MATERIALS PRODUCTION CENTER

POTENTIAL ARARs

K-65 DECANT SUMP TANK REMOVAL ACTION

Chemical, Location, or Action	Citation	ARAR/TBC	Rationale for Implementation	Compliance Strategy
	<p>•40 CFR 264.16 (Training) Operator must train personnel within 6 months of their assuming duties at a facility in hazardous waste management procedures relevant to their positions including emergency response training.</p>	Relevant and Appropriate		<p>All FMPC personnel are trained in accordance with 29 CFR 1910.120. Personnel involved with this Removal Action will be trained on the applicable operating procedures and K-65 Emergency Procedure.</p>
Discharge of Treatment System Effluent	<p>40 CFR 122.41 (1) OAC 3745-33-05</p> <p><u>Monitoring requirements</u> Discharges must be monitored to assure compliance. Discharges will be monitored for:</p> <ul style="list-style-type: none"> -the mass of each pollutant -the volume of each pollutant -frequency of discharge and other measurements as appropriate. 	Applicable	<p>Required of all direct discharges to waters of the U.S.. The effluent as a result of the treatment of the liquid removed will be discharged to the Great Miami River.</p>	<p>Effluent from the treatment of liquid removed from the K-65 decant sump tank will be monitored according to the requirements in the FMPC NPDES permit.</p>
	<p>40 CFR 136.1-136.4</p> <p>Approved test methods must be followed for waste constituents to be monitored. Detailed requirements for analytical procedures and quality controls are provided.</p>	Applicable		<p>Same as above.</p>

FEED MATERIALS PRODUCTION CENTER

POTENTIAL ARARS

K-65 DECANT SUMP TANK REMOVAL ACTION

Chemical, Location, or Action	Citation	ARAR/TBC	Rationale for Implementation	Compliance Strategy
	40 CFR 136.1-136.4 (Cont'd)			
	Sample preservation procedures, container materials, and maximum allowable holding times are prescribed.			
	40 CFR 122.41 (i)	Applicable		Same as above.
	Comply with additional substantive conditions such as:			
	-Duty to mitigate any adverse effect of any discharge; and			
	-Proper operation and maintenance of treatment systems.			
Chemicals in Drinking water	40 CFR 141.12	Relevant and Appropriate	The requirement is not applicable since no public water system is involved. It is relevant and appropriate to protect drinking water from the contaminants listed. These contaminants may mitigate or leach into the underlying aquifer.	The MIs specified will be met by the use of centralized VOC treatment facility at Plant 8 which was installed as part of the Consent Agreement Removal No. 1.
	The following MCLs for organic chemicals are the the maximum levels of a contaminant in water which is delivered to a free flowing outlet of the ultimate user of a public water system:			
	- Chloroform 0.1 mg/l			
	-Ethyl-benzene 0.7 mg/l*			
	-Pentachlorophenol 0.2 mg/l*			
	-PCBs 0.0005 mg/l*			
	-Tetrachloroethylene 0.005 mg/l*			

FEED MATERIALS PRODUCTION CENTER

POTENTIAL ARARs

K-65 DECANT SUMP TANK REMOVAL ACTION

Chemical, Location, or Action	Citation	ARAR/TBC	Rationale for Implementation	Compliance Strategy
Chemicals in Drinking Water	40 CFR 141.12 (Cont'd) -Toluene 2.0 mg/l* -Trichloroethylene 0.005 mg/l* -1,1,1 Trichloroethane.2 mg/l -Xylene 10.0 mg/l* *Proposed	Relevant and Appropriate		
Radiation Dose Limit (Drinking Water pathway)	DOE Order 5400.5, Chapter II, Section 1.a The exposure of members of the public to radiation sources as a consequence of all routine DOE activities shall not cause, in a year, an effective dose equivalent greater than 100 mrem from all exposure pathways.	To Be Considered	The radioactive constituents of the liquid removed from the decant sump tank could contribute to the dose to members of the public from drinking water.	The DCGs established by the referenced DOE Order can not be met with the current FHPC available waste water treatment facilities. The established DCGs will be attained when the AWWT is operational in 1993.

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K-65 DECANT SUMP TANK REMOVAL ACTION

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REMOVAL ACTION #9 -- DECANT SUMP TANK

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R-014-101.1	WMCO:EMT:90-539	REMOVAL SITE EVALUATION ON THE K-65 DECANT SUMP TANK WATER		08/17/90	WMCO DOE-FMPC	8	REPORT	RA #9 FILE
R-014-101.3		POTENTIAL ARARS K-65 DECANT SUMP TANK REMOVAL ACTION	0	/ /		5	ENCLOSURE	RA #9 FILE
R-014-205.1	DOE-1784-90	REMOVAL ACTION MEMORANDUM: K-65 DECANT SUMP TANK		08/23/90	DOE-FMPC WMCO	2	LETTER	RA #9 FILE
R-014-207.1		K-65 DECANT SUMP TANK REMOVAL ACTION WORK PLAN FEED MATERIALS PRODUCTION CENTER	D	09/01/90	WMCO DOE-ORO	45	WORK PLAN	RA #9 FILE
R-014-207.2		K-65 DECANT SUMP TANK REMOVAL ACTION WORK PLAN FEED MATERIALS PRODUCTION CENTER SEPTEMBER 1990		09/01/90	WMCO DOE-ORO	49	WORK PLAN	RA #9 FILE
R-014-207.3		K-65 DECANT SUMP TANK REMOVAL ACTION WORK PLAN FEED MATERIALS PRODUCTION CENTER DECEMBER 1990		12/01/90	WMCO DOE-ORO	100	WORK PLAN	RA #9 FILE
R-014-207.4		WMCO TECHNICAL RECOMMENDATIONS FOR THE RESPONSE TO U.S. EPA MODIFICATIONS OF THE K-65 DECANT SUMP TANK REMOVAL ACTION WORK PLAN	0	/ /		7	ENCLOSURE	RA #9 FILE
R-014-207.5	DOE-867-91	K-65 DECANT SUMP TANK REMOVAL ACTION	0	03/01/91	DOE-FMPC USEPA	2	LETTER	RA #9 FILE
R-014-207.6	DOE-76-91	K-65 DECANT SUMP TANK REMOVAL ACTION WORK PLAN		10/17/90	DOE-FSD EPA	2	LETTER	RA #9

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R-014-1001.1		K-65 DECANT SUMP REMOVAL		04/01/91	OEPA DOE-FMPC	1	LETTER	RA #9 FILE
R-014-1001.2		REMOVAL #5 - DECANT TANK U.S. DOE FERNALD OH6 890 008 976	0	01/10/91	USEPA DOE-FMPC	2	LETTER	RA #9 FILE
R-014-1001.3		COMMENTS K-65 DECANT SUMP TANK REMOVAL W.P.		11/19/90	OEPA DOE-FMPC	1	LETTER	RA #9 FILE
R-014-1001.4		CONDITIONAL APPROVAL K-65 DECANT SUMP REMOVAL WORK PLAN		01/11/91	OEPA DOE-FMPC	2	LETTER	RA #9 FILE
R-014-1001.5		REMOVAL #5 K-65 DECANT TANK U.S. DOE FERNALD OH6 890 008 976		11/13/90	USEPA DOE-FMPC	4	LETTER	RA #9 FILE
R-014-1003.1		THE USDOE ANNOUNCES THE AVAILABILITY FOR PUBLIC REVIEW OF THE ADMINISTRATIVE RECORD FILE FOR THE K-65 DECANT SUMP TANK REMOVAL ACTION AT THE DOE FMPC AT FERNALD, OH		/ /		1	ATTACHMENT	RA #9 FILE
R-014-1007.1		RESPONSE TO THE U.S. EPA COMMENTS K-65 DECANT SUMP TANK REMOVAL ACTION WORK PLAN		12/11/90	DOE-FMPC USEPA	8	REPORT	RA #9 FILE
R-014-1007.2		RESPONSE TO OHIO EPA COMMENTS K-65 DECANT SUMP TANK REMOVAL ACTION WORK PLAN		12/11/90	DOE-FMPC OEPA	2	REPORT	RA #9 FILE
R-014-1007.3		THE RESPONSE TO OHIO EPA GENERAL COMMENTS ON THE K-65 DECANT SUMP TANK REMOVAL ACTION WORK PLAN		/ /		2	LETTER	RA #9 FILE

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